

WHAT IS CLAIMED IS:

1. A remote particle counter in a laser radar apparatus, wherein suspended fine particles forming aerosols in the atmosphere which are far away from the site of laser emission are illuminated with laser light, the resulting backward scattered light from the individual fine particles is detected as image, and the number and size distribution of the suspended fine particles are measured at a remote site.

2. The remote particle counter according to claim 1, which comprises a pulsed laser generator, laser light emitting optics, scattered light collecting optics, a high-sensitivity two-dimensional photo detector as a scattered light detecting portion having a fast gating capability, and a control and measure system, and by which the scattered light due to laser application that comes from the individual fine particles in a limited atmospheric space a given distance away from the site of laser emission can be measured as an image.

3. The remote particle counter according to claim 1, wherein the fast gating capability is such that after the lapse of a certain time lag or delay time from laser emission, the high-sensitivity two-dimensional photo detector detects as image the scattered light signal intensity captured within a given duration of gate time, and by controlling said delay time and said gate time, the scattered light coming from the individual fine particles in a limited atmospheric space a given distance away from

the site of laser emission can be captured as an image.

4. The remote particle counter according to claim 1, wherein the image of the scattered light from the individual faraway fine particles in the atmosphere as measured with the high-sensitivity two-dimensional photo detector having the fast gating capability looks like either a dense or sparse cloud of spots, which are analyzed to determine the number and size distribution of the fine particles within the limited space of the atmosphere, the latter being determined by the brightness or intensity of the spots.

5. The remote particle counter according to claim 1, wherein the delay time in shutter closure by the fast gating capability of the high-sensitivity two-dimensional photo detector and the direction of laser emission are varied and controlled continuously and independently so as to provide information about the three-dimensional spatial distribution over a broad range of the number and size distribution of the fine particles in the atmosphere.

6. The remote particle counter according to claim 1, wherein the temporal changes in the spatial distribution of the number and size distribution of the fine particles in the atmosphere as obtained by controlling the delay time and the direction of laser emission are captured and analyzed to obtain information about the wind velocity and direction of the atmosphere.